

[METHOD OF FORMING MULTIPLE OXIDE LAYERS WITH DIFFERENT THICKNESSES IN A LINEAR NITROGEN DOPING PROCESS]

Abstract of Disclosure

Multiple oxide layers with different thicknesses are formed on a semiconductor substrate with a silicon surface, having a first and second region. A sacrificial oxide layer is formed on the silicon surface to cover both the first region and the second region, with a mask layer formed on the surface of the sacrificial oxide layer. By defining and patterning the mask layer, a first opening and a second opening, having predetermined surface areas, are formed in portions of the first and second regions of the mask layer to expose portions of the. The sacrificial oxide layer has a surface area equal to the first predetermined surface area, and portions of the sacrificial oxide layer having a surface area equal to the second predetermined surface area. A linear nitrogen doping process is then performed to simultaneously implant nitrogen ions with a first and second predetermined concentration into the first and second region, through the first opening and the second opening, respectively. Thereafter, the mask layer and the sacrificial oxide layer are removed, respectively. An oxidation process is performed to two silicon oxide layers with different thicknesses in the first and second regions.